In the Claims

CLAIMS

Claims 1-16 (Canceled).

17. (Currently amended) A system for damping oscillations in cooling channels of an optical element through which fluid flows in a component with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers, ~~and~~

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same,

wherein said sensors are piezoelectric elements, and

wherein said piezoelectric elements are arranged alternately as sensors and as actuators in the component.

18. (Previously presented) The system as claimed in claim 17, wherein said actuators and said sensors are arranged in an region of turbulence zones on or in the component.

19. (Currently amended) The system as claimed in claim 17, wherein said actuators and said sensors are arranged in an region of the greatest expected deformation.

20. (Previously presented) The system as claimed in claim 19, wherein said sensors and the actuators are arranged in the region of channel direction changes.

Claims 21-22 (Canceled).

23. (Currently amended) The system as claimed in claim ~~21~~ 17, wherein all of said piezoelectric elements act as sensors in the quiescent state or when the oscillation excitation is low, and selected elements are activated as actuators as a function of oscillation excitation.

24. (Previously presented) The system as claimed in claim 17, wherein an adaptronic control loop is provided.

25. (Currently amended) A projection exposure objective for semiconductor lithography with a system for damping oscillations in cooling channels of an optical element with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers, ~~and~~

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same, and

wherein the oscillations that are detected by the sensors originate from a cooling channel of an optical element.

26. (Currently amended) The system as claimed in claim 25, wherein said actuators and said sensors are arranged in an region of turbulence zones on or in the cooling channel of the projection exposure objective.

27. (Currently amended) The system as claimed in claim 25, wherein said actuators and said sensors are arranged in an region of the greatest expected deformation.

Claim 28 (Canceled).

29. (Previously presented) The system as claimed in claim 25, wherein said sensors are piezoelectric elements.

30. (Previously presented) The system as claimed in claim 25, wherein the oscillations that are detected by the sensors originate from a projection exposure objective for semiconductor lithography.

31. (Currently amended) An optical element with a system for damping oscillations in cooling channels of the optical element with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers, ~~and~~

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same, and

wherein said sensors and the actuators are arranged in an region of channel direction changes.

Claim 32 (Canceled).

33. (Previously presented) The optical element as claimed in claim 31, wherein said sensors are piezoelectric elements.

34. (Previously presented) The optical element as claimed in claim 31, wherein the oscillations that are detected by the sensors originate from a cooling channel of the optical element.

35. (Previously presented) The optical element as claimed in claim 33, wherein said piezoelectric elements comprise the only structure of the actuators.

36. (Previously presented) A system for damping oscillations in cooling channels of an optical element through which fluid flows in a component with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers,

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same, and

wherein actuators and sensors are arranged in the region of the greatest expected deformation, and wherein said sensors and the actuators are arranged in the region of channel direction changes.

37. (Previously presented) A system for damping oscillations in cooling channels of an optical element through which fluid flows in a component with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers,

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same, and

wherein said sensors are piezoelectric elements, and wherein said piezoelectric elements are arranged alternately as sensors and as actuators in the component.

38. (Previously presented) A system for damping oscillations in cooling channels of an optical element through which fluid flows in a component with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers,

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same, and

wherein said sensors are piezoelectric elements, and wherein all of said piezoelectric elements act as sensors in the quiescent state or when the oscillation excitation is low, and selected elements are activated as actuators as a function of oscillation excitation.

39. (Currently amended) A system for damping oscillations in a structure, comprising:

a sensor provided in sensing relation with a structure to detect first oscillations from the structure;

an actuator comprising a piezoelectric element secured to and directly contacting the structure;

a control loop coupled between the sensor and the actuator, the control loop is configured to provide data from the sensor comprising at least phase, frequency and amplitude of the first oscillations and send the data to the actuator; ~~and~~

in response to the data, the actuators are configured to activate to produce second oscillations which are opposite in phase to the first oscillations and which have substantially the same frequency and amplitude of the first oscillations; and

wherein the first oscillations originate from flowing fluid through a cooling channel.

40. (Previously presented) The system of claim 39 wherein the piezoelectric element comprises a thin plate, film or layer.

41. (Previously presented) The system of claim 39 wherein the sensor and actuator are positioned on the structure proximate regions of greatest deformation.

42. (Previously presented) The system of claim 39 wherein the actuator comprises no intermediate structure between the piezoelectric element and the structure with the first oscillations.

43. (Previously presented) The system of claim 39 wherein the structure comprises channels for receiving fluid.

44. (Previously presented) The system of claim 39 wherein the structure is tubular for receiving flowing fluid.

Claim 45 (Canceled).

46. (Previously presented) The system of claim 39 wherein the structure comprises cooling channels for an optical element.

47. (Previously presented) The system of claim 39 wherein the structure comprises cooling channels for a projection exposure objective configured for use in semiconductor lithography.

48. (Previously presented) The system of claim 39 wherein the sensor comprises a piezoelectric element.

49. (Previously presented) The system of claim 39 wherein the sensor comprises a piezoelectric element formed as a thin plate, film or layer.

50. (New) A system for damping oscillations in cooling channels of an optical element through which fluid flows in a component with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers,

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same,

wherein said actuators and said sensors are arranged in an region of the greatest expected deformation, and

wherein said sensors and the actuators are arranged in the region of channel direction changes.

51. (New) A system for damping oscillations in cooling channels of an optical element through which fluid flows in a component with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers,

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same,

wherein said sensors are piezoelectric element, and

wherein all of said piezoelectric elements act as sensors in the quiescent state or when the oscillation excitation is low, and selected elements are activated as actuators as a function of oscillation excitation.

52. (New) An optical element with a system for damping oscillations in cooling channels of the optical element with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers,

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same, and

wherein the oscillations that are detected by the sensors originate from a cooling channel of the optical element.